

**REMARKS**

Claims 22, 27, 29, 30, 32, 33, 35, 42, and 43 were previously pending in the application. This Amendment amends claims 22, 27, and 29. Claims 26, 30, 32, 33, 35, and 42 remain unchanged. Claims 22 and 29 are independent.

Entry of this Amendment is proper because it does not raise any new issues requiring further search by the Examiner, narrows the issues on appeal, and is believed to place the present application in condition for immediate allowance.

**The Claimed Invention**

Conventional coffee machines operate according to different principles. Many common models include so-called pressureless coffee machines in which water flows from a storage container into an electrically heatable pipe. As a result of the evolution of steam in this pipe, heated water is then pressed through a riser to an outlet via which the heated water then drips into a coffee filter. The filter coffee can then flow from this coffee filter at atmospheric pressure into a pot.

Conventional coffee machines commonly may be fitted with a continuous flow heater having a thermoblock. In many cases, such a thermoblock consists of cast aluminium with water-carrying channels being formed inside the block. The thermablock is used to control heating of the water both with regard to an evolution of steam and a constant nature of the coffee temperature. However, a thermoblock is expensive to manufacture and requires a relatively large mass to store the heat.

The present application explains that continuous-flow heaters without a thermoblock may be cost-effective but also have some disadvantages when operated with coffee pads, particularly in instances in which the coffee machine must make hot coffee available immediately in a short time at a specific temperature or the time sequence for making a cup of coffee is very short. Such disadvantages commonly may include uncontrolled evolution of steam with corresponding excess pressure, and a high dependence of the coffee outlet temperature on factors such as water temperature in the tank, ambient temperature, mains voltage fluctuations and tolerances of the heater.

The present invention provides a method and an electronic control device for satisfactorily operating a coffee machine having a continuous flow heater without a thermoblock, which is particularly suitable for preparing coffee using coffee pads, and that recognizes and solves the aforementioned problems. The method and device can control an evolution of steam in the heating processes using a pulsed operation of the pump such that no steam overpressure occurs and a sufficiently high water temperature is provided from the beginning of the brewing process.

The method can switch on the pump before the beginning of heating and operate the pump with a first cycle ratio between switch-on time and switch-off time, such that the cycle ratio becomes larger with increasing temperature and that the cycle ratio is above a predefined temperature threshold. In this way, the present invention can avoid overheating and steam overpressure. Furthermore, the present invention can supply water at the same temperature in almost every phase of the brewing process.

See, e.g., paragraphs [002] - [035].

### **The Rejection under 35 U.S.C. § 102**

Claims 22, 26-27, 29, 30, 35 and 42 are rejected under 35 U.S.C. § 102(b) as being anticipated by the Liverani reference (U.S. Patent No. 5,738,001).

The Advisory Action dated October 14, 2011, asserts that “Liveroni teaches the pulsing of a pump in response to the values received from two temperature sensors; see col. 1, line 60 to col. 2, line 19 (especially see col. 1, line 63 and col. 2, lines 10-11) and col. 5, lines 6-14, and lines 45-50.”

The Response to Arguments of the final Office Action dated October 25, 2011, then modifies the grounds of rejection to rely on col. 4, lines 28-37, and Fig. 3 and asserts:

“the concept of utilizing a second temperature sensor (as indicated by element 13A) and specifically states that "Fig. 3 is no more than the diagram shown in Fig. 1 with the addition of a temperature sensor 13A that touches duct 2, and connected to unit 14A by means of wire 18A,

upstream and close to heat exchanger 7." Liverani implies that the functionality of the embodiment disclosed in Fig. 3 will be identical to that of Fig. 1 except that there will be an additional signal supplied from the temperature sensor 13A. Thus even if applicant were to rephrase claim 22 to require, 'An influencing of both the water conveyed by the pump and the heating power in response to the amount of water conveyed by the pump and the heating power in response to the first and second temperatures" the claimed invention would still not be patentable."

Applicants respectfully traverse this rejection.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. [...] The identical invention must be shown in as complete detail as is contained in the ... claim." M.P.E.P. § 2131.

Claim 22 recites "controlling an evolution of steam and pressure in the continuous flow heater by influencing an amount of water conveyed by the pump in response to the first and second temperatures by performing a pulsed operation of the pump until a temperature of the water reaches a predefined temperature threshold."

Claim 29 recites "means for influencing an amount of water conveyed by the pump in response to temperatures measured by the first and second temperature sensors by performing a pulsed operation of the pump until a temperature of the water reaches a predefined temperature threshold, thereby controlling an evolution of steam and pressure in the continuous flow heater." See, e.g., paragraphs [015], [034], [035], and [057].

Contrary to the assertions in the Office Action, Applicants respectfully submit that the Liverani reference does not provide any teaching of controlling an evolution of steam and pressure in the continuous flow heater by performing a "*pulsed operation*" of the pump 6, according to the present invention.

The present invention distinguishes between turning the pump ON and performing a *continuous operation* of the pump (see, e.g., S02, S06 in FIG. 3 of the

present application) until a temperature is reached and turning the pump ON and performing a *pulsed operation* of the pump (see, e.g., S04 in FIG. 3 of the present application) until a temperature is reached.

For example, with reference to FIG. 3, the present invention discloses that:

In step S04 the pump 32 now goes over into *pulsed operation* in order to thus avoid local overheating and resulting undesirable steam overpressure on the one hand and on the other hand, to convey an amount of water appropriate to the available heating capacity. In step S05 it is checked whether a temperature threshold  $T_s$  is achieved at the continuous flow heater 38. If this is not the case, the pump 32 remains in pulsed mode, wherein however the cycle ratio can be varied in favour of the switch-on time with increasing temperature. Only when it is determined in step S05 that a threshold temperature  $T_s$  is reached at the continuous flow heater 38, does the pump 32 operate continuously in step S06. After removing the coffee, the brewing process ends in step S07.

See paragraph [057]; emphasis added.

Thus, the present invention discloses that the “*pulsed operation*” is performed until the threshold temperature  $T_s$  is reached at the continuous flow heater 38. In order to rapidly reach the required high brewing temperature, the pump is switched in a specific ON/OFF cycle so that no steam overpressure occurs. The method is designed so that the pump only conveys fully without interruption when a sensor or regulator on the heater indicates that a certain temperature is reached. See, e.g., paragraphs [034] and [035].

The present invention explains that such “*pulsed operation*” of the pump can have the effect that no steam overpressure occurs and the water having a sufficiently high temperature is still provided from the beginning of the brewing process. See, e.g., paragraph [015].

In comparison, as the Examiner points out, FIG. 3 of the Liverani reference discloses the addition of a temperature sensor 13A upstream and close to heat exchanger 7 and that the control system 14A is fitted with a unit able to control the function of the pump as a function of the difference between the water temperature detected at the exit of the heat exchanger and the water temperature detected at the entry to the heat exchanger. See, e.g., col. 6, lines 11-18. Claim 4 of the Liverani reference discloses that an additional temperature sensor (13A) is located upstream from the heat exchanger and the control device (14A) processes simultaneously the signals received from the temperature sensors (13, 13A) in order to control instant by instant the pump delivery (6, 24) as a function of the difference between the water temperature detected by the sensor downstream (13) and the water temperature detected by the sensor upstream (13A) from the heat exchanger (7).

However, in contrast to the present invention, the Liverani reference does not disclose a “*pulsed operation*” of the pump, as claimed. Instead, the Liverani reference simply teaches that the pump 6 is turned on and continuously operated until a certain amount of water (i.e., until the desired volume of standard coffee drink or diluted coffee drink) is pumped through the heat exchanger 7 based on the signal from the delivery counter means 12 or when the water has re-acquired the reference temperature. The Liverani reference only turns the pump off when a certain amount of water is delivered (in the first embodiment) or when the water temperature drops below the reference temperature (in the second embodiment).

Specifically, the Liverani reference discloses:

[...] the module 24 to intermittently feed electricity to the vibrating pump 6 is connected by means of conductor 25 to the programmed control device 14A that processes the signals received from the temperature sensor 13 according to a given algorithm, so that the vibrating pump 6 is activated after three seconds from the moment in which the user has activated the machine to request a standard coffee, is deactivated when the

*water temperature drops below the reference temperature and is activated again when the water has re-acquired the reference temperature* (the said three seconds is the time necessary to be certain that the water within the heat exchanger has reached the reference temperature).

See, e.g., col. 4, lines 10-23 and 32-34; and col. 5, lines 46-47.

The disclosure of the module 24 intermittently feeding electricity to the pump appears to be referring only to disactivating the pump when the water temperature drops below the reference temperature and activating the pump again when the water has re-acquired the reference temperature, not performing a pulsed operation of the pump until the temperature is reached.

Moreover, contrary to the assertions in the Office Action, col. 1, line 60 to col. 2, line 19 (which is relied upon for these features at page 3 of the Office Action) does not teach performing a pulsed operation of the pump, as claimed. Instead, the Liverani reference teaches that the operation means for setting the temperature directs “pulses to the control unit,” which is not the same as performing a pulsed operation of the pump.

Thus, the Liverani reference does not explicitly disclose all of the features of claims 22 and 29, and therefore, does not anticipate these claims.

Claims 27, 29, 30, 35, and 42 are patentable over the applied reference by virtue of their dependency from claims 22 and 29, respectively, as well as for the additional features recited therein.

For example, the Liverani reference does not disclose that the pump is switched on before a beginning of heating and is operated with a first cycle ratio between switch-on time and switch-off time, the first cycle ratio becoming larger with increasing temperature, and the first cycle ratio being above a predefined temperature threshold, as recited in claim 27. Applicants respectfully submit that the Office Action does not

appear to cite any support for these features in the Liverani reference. Thus, the Office Action does not establish that the Liverani reference discloses these features.

Additionally, the Response to Arguments of the final Office Action, at page 5, numbered paragraph 7, asserts that:

“Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.”

The final Office Action does not explain this position or provide any support for this assertion. Contrary to these assertions, Applicants' Amendment filed on September 29, 2011, amended the claims and presented arguments pointing out the specific distinctions believed to render the claims, including the newly presented claims, patentable over the applied references, thereby clearly making a bona fide attempt to advance the application to final action. Applicants' Amendment specifically pointed out how the language of independent claims 22 and 29 are believed to patentably distinguish over the Liverani reference. See Amendment filed on September 29, 2011, at page 6, last paragraph. For these reasons, Applicants' Amendment filed on September 29, 2011, clearly complied with the requirements of 37 C.F.R. § 1.111(b).

Applicants respectfully request withdrawal of this rejection.

**The Rejections under 35 U.S.C. § 103**

Claims 32 and 33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Liverani reference in view of the Harrison reference (U.S. Patent No. 5,417,152). Claim 35 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the Liverani reference.

Applicants respectfully traverse these rejections.

Claims 32, 33, and 35 are patentable over the applied reference by virtue of their dependency from claim 29, as well as for the additional features recited therein.

For example, claim 32 recites wherein the means for influencing the amount of water conveyed includes a restrictor. Claim 33 recites wherein the restrictor includes a slider disposed in the conveying section. Claim 35 recites wherein the continuous flow heater includes a plurality of heaters and the means for influencing the heating power comprises a controller for switching on different numbers of the plurality of heaters.

Contrary to the assertions in the Office Action, one of ordinary skill in the art would not have any apparent reason to combine the teachings of the Liverani reference in view of the Harrison reference to arrive at claims 32 and 33. The Harrison reference is concerned with speed control in a juice extractor. The Harrison reference has no relation to the purpose of the Liverani reference, which is to maintain the reference temperature of the water exiting the heat exchanger. See, e.g., Abstract. The Liverani reference does not disclose or mention speed control. Thus, one of ordinary skill in the art would not have any apparent reason to combine the teachings of the Liverani reference in view of the Harrison reference to arrive at claims 32 and 33. For these reasons, Applicants respectfully submit that the features of claims 32 and 33 are not an obvious variation of the teachings of the Liverani reference and the Harrison reference, and would not be obvious to try based on the teachings of these references without the benefit of the teachings of the present invention.

Applicants respectfully request withdrawal of these rejections.

**CONCLUSION**

In view of the above, entry of the present Amendment and allowance of Claims 22, 27, 29, 30, 32, 33, 35, 42, and 43 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

Respectfully submitted,

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March 29, 2012

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